Title: Polygons

Brief Overview:

Students will investigate certain websites to access information about polygons. The lesson includes definitions of parts and types of polygons, as well as formulas for finding the sum of interior and exterior angles and the individual interior and exterior angles of a regular polygon. Students will access JAVA applets for an interactive discovery approach to some topics. Students will take a quiz posted on the Internet. Lastly, students will complete a website scavenger hunt, which highlights uses of polygons.

Links to NCTM 2000 Standards:

- **Mathematics as Problem Solving, Reasoning and Proof, Communication, Connections, and Representation**
  These five process standards are threads that integrate throughout the unit, although they may not be specifically addressed in the unit. They emphasize the need to help students develop the processes that are the major means for doing mathematics, thinking about mathematics, understanding mathematics, and communicating mathematics.

- **Number and Operation**
  Students will calculate the sum of interior and exterior angles. Students will calculate the measure of interior and exterior angles of a regular polygon.

- **Patterns, Functions, and Algebra**
  Students will investigate and discover the formulas for interior and exterior angles of a polygon based on triangle patterns.

- **Geometry and Spatial Sense**
  Students will find on the Internet and use the parts, types, and formulae for polygons. They will investigate polyhedron and other real world applications of polygons.

Links to Virginia High School Mathematics Core Learning Units:

- **G.3**
  Students will solve practical problems involving complementary, supplementary, and congruent angles that include vertical angles, angles formed when parallel lines are cut by a transversal, and angles in polygons.

- **G.9**
  Students will use measures of interior and exterior angles of polygons to solve problems. Tessellation and tiling problems will be used to make connections to art, construction, and nature.

Grade/Level:

Grades 9-12, Geometry

Duration/Length:

2 block classes

Prerequisite Knowledge:

Students should have working knowledge of the following skills:

- The angle measure in a circle is 360º.

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Objectives:

Students will be able to:

- classify and define basic properties of polygons.
- calculate the sum of the exterior and interior angles of any polygon.
- calculate each exterior and interior angle of a **regular** polygon.
- use Internet sites to gather information.

Materials/Resources/Printed Materials:

- Internet Lab
- Simple calculator
- Polygon Lab

Development/Procedures:

Day 1:
Students will complete the Polygon Worksheet using the on-line sites listed. They will complete the on-line interactive Polygon Identification Activity.
(Access site and fill out and print for teacher.)
http://www.coe.tamu.edu/~strader/M…oometry/PolygonLesson/identify.html
Teachers will assign appropriate homework from their own textbook.

Day 2:
Students will take the Polygon Quiz posted on the Internet and print for teacher.
http://www.kn.pacbell.com/wired/fil/pages/sampolygonsms.html
Students will complete the Hunt for Polygons Worksheet using on-line sites.
http://www.kn.pacbell.com/wired/fil/pages/huntpolygonsbr.html

Assessment:

Students will fill out the Polygon Worksheet. They will take an on-line quiz on the material. They will complete a Scavenger Hunt on-line.

Extension/Follow Up:

This topic is closely related to tessellations and finding area and perimeter of polygons. Internet sites on these topics are provided in **Sites on the Internet Relating to Polygons.**

Teacher Notes

1. Test all Internet sites before using activities to make sure that they are currently operational

2. Applets are short interactive programs. Applets are slow to load but are worth the time. Please be patient. Practice using applets before you introduce them to students. They are easy to use but do not always have enough instructions. Play with them until you can interact with them.

3. Before using Applet #2, you can have the students cut a triangle into pieces so that the angles can be put together to form a straight line. With more intuitive students, you may want to skip this activity and just use the applet.

4. While doing this project, the authors found many other Geometry and Math sites on the Internet. They are listed in **Geometry Hot List of Internet Sites.**

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POLYGON WORKSHEET

Directions: Please use the websites below to answer the following questions about Polygons

1. http://www.mathleague.com/help/geometry/polygons.htm
2. http://tqd.advanced.org/14018/polygons.htm
3. http://www.coolmath.com/interior.htm
4. http://www.geom.umn.edu/~dwiggins/conj07.html

BASICS OF POLYGONS

1. Define **Polygon**

2. Name 3 reasons why a geometric figure would not be a polygon
   a.

   b.

   c.

3. Define **side** of a polygon

4. Define **vertex** of a polygon

5. Define **diagonal** of a polygon

6. Define **regular** polygon

7. a. Discuss the difference between **convex** and **concave** polygons

b. Draw and label a picture of each in the space provided below

8. Match the following geometric term with its definition below

a. Parallelogram	i. A figure with 4 equal sides and 4 right angles
b. Rhombus	ii. A figure with 4 right angles and opposite sides being the same length
c. Square	iii. A figure with 4 equal sides and opposite angles being the same degree measurement
d. Trapezoid	iv. A figure with 4 sides and only one set of those sides are parallel
e. Rectangle	v. A figure with 4 sides and two sets of those sides sides are parallel, but angles may not be right

INTERIOR ANGLES OF A POLYGON

9. Using the websites listed at the beginning of the worksheet, fill in the missing items on the chart below.
   - 9I will be completed when you get to problem 10.
   - The column labeled " **Measure of each interior angle**" will be completed when you get to problem 12.

	Name of Geometric Figure	Number of Sides	Sum of Interior Angles	Measure of each interior angle
A	**Triangle**			
B	**Quadrilateral**			
C		**5**		
D	**Hexagon**			
E			**900°**	
F		**8**		
G		**9**		
H			**1440°**	
I		**14**		

10. Go to the following website: http://www.utc.edu/~cpmawata/geom/geom2.htm
** Be patient. The applet might take a few minutes to load

There are two applets on this website you will be using

Applet #1: Follow the directions given in the Applet. You will be looking at the angle measurements of the triangle you drew with the applet. Place your drawing below and fill in the angle measurements of your triangle:

Drawing:

Angle A	Angle B	Angle C

What is the sum of angles A, B, and C? _____

Applet #2: Scroll down to the bottom of the page. You will notice a blank space and then a bar below it labeled "**GO"**. To start the applet, click on "**GO**". Continue clicking **"NEXT"** until the animation is complete.

From this animation, what can you tell me about a triangle?

11. Go to the **Cool Math** website listed at the beginning of the worksheet. Read through Method 1 and answer the following questions.
    a. What does the number of triangles have to do with the number of sides of the polygon?

    b. Using Method 1 of splitting the polygon into triangles, how can you find **the sum of the interior angles?**

    c. Using the 3 figures (Square, Pentagon, and Hexagon) given in Method 1, calculate the **sum of the interior angles** for each figure (Show your work below)

        Square:

        Pentagon:

        Hexagon:

    d. A tetrakaidecagon has 14 sides. Calculate the **sum of the interior angles** using Method 1. Show your work below and place your answer in the chart for problem #9.

Return to any of the websites listed at the beginning of the worksheet to help you complete the worksheet

12. a. What is the formula for the **Sum of the Interior Angles** of a polygon?

b. What is the formula for the **Measure of each Interior Angle** of a regular polygon?

c. Using the formula above, find the sum of the interior angles of a hexagon

d. Compute and complete the "**measure of each interior angle**" column of problem #9. Show your calculations below.

EXTERIOR ANGLES

13. Go to: **http://www.geom.umn.edu/~dwiggins/conj09.html**

    a. Define exterior angles:

    b. Draw an example of an exterior angle

14. Go to: **http://www.geom.ies.co.jp/math/java/gaikaku/gaikaku.html**
    ** Be patient, the applet might take a few minutes to load

    a. Follow the directions for the applet.

    b. Describe what you saw as you scaled the polygon down smaller and smaller.

    c. What does the sum of the exterior angles add up to?

    d. If you have a **regular pentagon**, how could you find what the measure of each individual exterior angle is?

    e. Compute what the measure of each exterior angle of a **regular pentagon** would be.

    f. What would the formula be to find the degree measure for each exterior angle?

15. Go to: **http://www.ies.co.jp/math/java/logo/logo.html**
**Be patient, the applet might take a few minutes to load

You have pulled up "**Polygon Creator**"

•Please read through the directions and the example of how to use the applet to draw a polygon using the degree measure for the exterior angle
•Using the applet, you will draw a pentagon, octagon and a decagon.

A. Calculate the measure of one exterior angle of a **regular pentagon** and pick a side length for your pentagon(show work below)

1. Using the applet, draw your octagon
2. Did it work? _____
3. After calculating your exterior angle, calculate the measure of the interior angle of the pentagon: (Show work below)

B. Calculate the measure of one exterior angle of an **regular octagon** and pick a side length for your octagon (show work below)

1. Using the applet, draw your octagon
2. Did it work? _____
3. After calculating your exterior angle, calculate the measure of the interior angle of the octagon: (Show your work below)

POLYGON WORKSHEET- Answer Key

Directions: Please use the website below to answer the following questions about Polygons

1. http://www.mathleague.com/help/geometry/polygons.htm
2. http://tqd.advanced.org/14018/polygons.htm
3. http://www.coolmath.com/interior.htm
4. http://www.geom.umn.edu/~dwiggins/conj07.html

BASICS OF POLYGONS

1. Define **Polygon**
   A closed figure with the same number of sides and angles, and the sides are line segments.

2. Name 3 reasons why a geometric figure would not be a polygon
   a. *Figure has a rounded appearance.*

   b. *Figure is open and two of the vertices do not intersect.*

   c. *Two of the sides intersect and cross each other, such as a star.*

3. Define **side** of a polygon
   Side is the line segment between two of the vertices in a polygon.

4. Define **vertex** of a polygon
   Vertex is the point of a polygon where two sides intersect.

5. Define **diagonal** of a polygon
   Diagonal is the line segment joining two non-adjacent pairs of angles in a polygon.

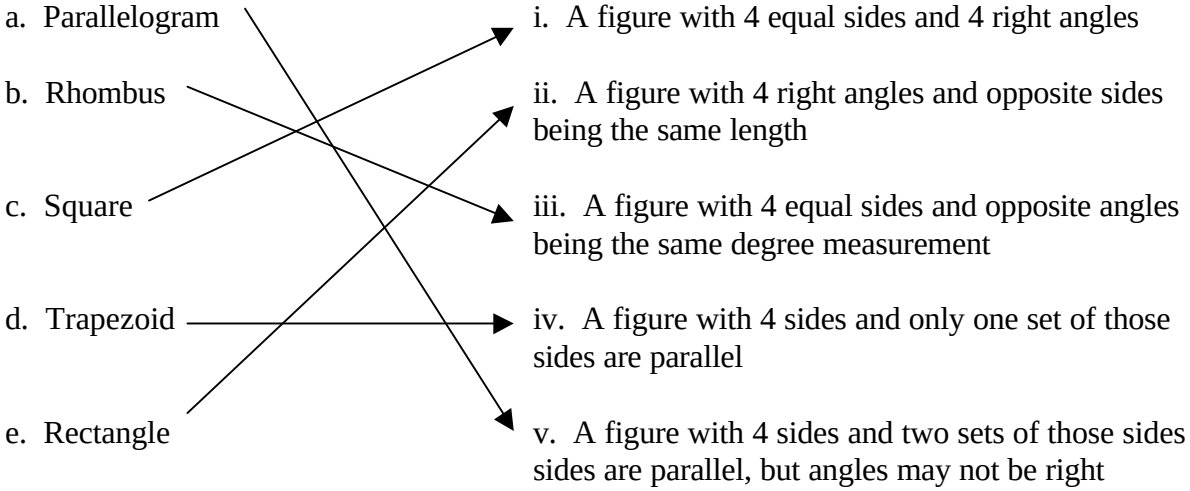
6. Define **regular** polygon
   A regular polygon is a polygon in which all the angles are the same, and all the sides are the same length.

7. a. Discuss the difference between **convex** and **concave** polygons

If you draw a line segment between any two points inside the polygon it will be convex if that line remains inside the figure. However, on a concave polygon that line between two points might go outside the figure.

b. Draw and label a picture of each in the space provided below

8. Match the following geometric term with its definition below



INTERIOR ANGLES OF A POLYGON

9. Using the website listed at the beginning of the worksheet, fill in the missing items on the chart below.
   - 9I will be completed when you get to problem 10.
   - The column labeled " **Measure of each interior angle**" will be completed when you get to problem 12.

	Name of Geometric Figure	**Number of Sides**	**Sum of Interior Angles**	**Measure of each interior angle**
A	**Triangle**	*3*	*180*	*60*
B	**Quadrilateral**	*4*	*360*	*90*
C	*Pentagon*	**5**	540	*108*
D	**Hexagon**	*6*	*720*	*120*
E	*Heptagon*	*7*	**900°**	*~128.57*
F	*Octagon*	**8**	*1080*	*135*
G	*Nonagon*	**9**	*1260*	*140*
H	*Decagon*	*10*	**1440°**	*144*
I	*Tetrakaidecagon*	**14**	*2160*	*~154.29*

10. Go to the following website: http://www.utc.edu/~cpmawata/geom/geom2.htm
** Be patient. The applet might take a few minutes to load
There are two applets on this website you will be using

Applet #1: Follow the directions given in the Applet. You will be looking at the angle measurements of the triangle you drew with the applet. Place your drawing below and fill in the angle measurements of your triangle:

Drawing:

Angle A	**Angle B**	**Angle C**

Answers will vary based on students' drawings

What is the sum of angles A, B, and C? ___*180*_____

Applet #2: Scroll down to the bottom of the page. You will notice a blank space and them a bar below it labeled "**GO"**. To start the applet, click on "**GO**". Continue clicking **"NEXT"** until the animation is complete.

From this animation, what can you tell me about a triangle?

The sum of the three angles of a triangle is 180 degrees

11. Go to the **Cool Math** website listed at the beginning of the worksheet. Read through Method 1 and answer the following questions.
    a. What does the number of triangles have to do with the number of sides of the polygon?
       The number of triangles is 2 less than the number of sides of the polygon

    b. Using Method 1 of splitting the polygon into triangles, how can you find **the sum of the interior angles?**

       Split the polygon into triangles.
       Multiply the number of triangles times 180

    c. Using the 3 figures (Square, Pentagon, and Hexagon) given in Method 1, calculate the **sum of the interior angles** for each figure (Show your work below)

       Square: *2 X 180=360*

       Pentagon: *3 X 180=540*

       Hexagon: *6 X 180=720*

    d. A tetrakaidecagon has 14 sides. Calculate the **sum of the interior angles** using Method 1. Show your work below and place your answer in the chart for problem #8

       There will be 12 triangles: 12 X 180=2160

Return to any of the websites listed at the beginning of the worksheet to help you complete the worksheet

12. a. What is the formula for the **Sum of the Interior Angles** of a polygon?

180(n-2)

b. What is the formula for the **Measure of each Interior Angle** of a regular polygon?

$$\frac{180(n-2)}{n}$$

c. Using the formula above, find the sum of the interior angles of a hexagon

180(6-2)= 180(4)=720

d. Compute and complete the "**measure of each interior angle**" column of problem #9. Show your calculations below.

Triangle: [180(3-2)]/3=60

Quadrilateral: [180(4-2)]/4=[180(2])/4=360/4=90

Pentagon: [180(5-2)]/5=[180(3)]/5=540/5=108

Hexagon: [180(6-2)]/6=[180(4)]/6=720/6=120

Heptagon: [180(7-2)]/7=900/7= ~128.57

Octagon: [180(8-2)]/8= 1060/8=135

Nonagon: [180(9-2)]/9=1260/9=140

Decagon: [180(10-2)]/10=1440/144

Tetrakaidecagon: [180(14-2)]/14=2160/14=~154.29

EXTERIOR ANGLES

13. Go to: **http://www.geom.umn.edu/~dwiggins/conj09.html**

    a. Define exterior angles:
       The angle formed by extending one of the sides of a polygon from a vertex

    b. Draw an example of an exterior angle

14. Go to: **http://www.geom.ies.co.jp/math/java/gaikaku/gaikaku.html**
    ** Be patient, the applet might take a few minutes to load

    a. Follow the directions for the applet.

    b. Describe what you saw as you scaled the polygon down smaller and smaller.

       The individual exterior angles came together to form a circle- 360°

    c. What does the sum of the exterior angles add up to?
       360°

    d. If you have a **regular pentagon**, how could you find what the measure of each individual exterior angle is?
       Since the sum of the exterior angles is 360, divide the number of sides into 360

    e. Compute what the measure of each exterior angle of a **regular pentagon** would be.

       360/5=72°

    f. What would the formula be to find the degree measure for each exterior angle?

       360/n

15. Go to: **http://www.ies.co.jp/math/java/logo/logo.html**
**Be patient, the applet might take a few minutes to load

You have pulled up "**Polygon Creator**"

•Please read through the directions and the example of how to use the applet to draw a polygon using the degree measure for the exterior angle
•Using the applet, you will draw a pentagon, octagon and a decagon.

A. Calculate the measure of one exterior angle of a **regular pentagon** and pick a side length for your pentagon(show work below)

360/5=72

1. Using the applet, draw your octagon
2. Did it work? _____
3. After calculating your exterior angle, calculate the measure of the interior angle of the pentagon: (Show work below)

180-72=108

B. Calculate the measure of one exterior angle of an **regular octagon** and pick a side length for your octagon (show work below)

360/8=45

1. Using the applet, draw your octagon
2. Did it work? _____
3. After calculating your exterior angle, calculate the measure of the interior angle of the octagon: (Show your work below)

180-45=135°

POLYGON QUIZ

an Internet Sampler on POLYGONS

created by Ms. Brown
Fairfax County Public Schools

Introduction | Internet Activities | Conclusion | HyperText Dictionary

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Introduction

Polygon Quiz

Now that you are an expert on Polygons, show me what you know. Complete the following quiz and turn in an answer sheet to your teacher.

Good Luck !

1. How many sides does a quadrilateral have?
2. What is a four sided polygon in which all the sides are equal, but not always right angles?
3. What kind of polygon has only one pair of parallel sides?
4. What kind of polygon has the sum of the interior angles 540 degrees?
5. What is the sum of the interior angles of an octagon?
6. What is the sum of the interior angles of a rectangle?
7. What is the name of a 9 sides polygon?
8. What kind of polygon has the sum of the interior angles 1440 degrees?
9. How many sides does a Dodecagon have?
10. How many triangles can a square be divided into?
11. How many triangles can a pentagon be divided into?
12. How many triangles can a hexagon be divided into?
13. What kind of figure has two sets of parallel sides and all sides are the same length?
14. What is the formula to find the sum of the interior angles of a polygon?
15. What is the formula to find the measurement of each individual interior angle of a regular polygon?
16. What is the sum of the exterior angles of any polygon?
17. What would the measure of one exterior angle of a regular pentagon be?

18. What would the measure of one exterior angle of a regular hexagon be?
19. What would the measure of one interior angle of a regular pentagon be?
20. What would the measure of one interior angle of a regular octagon be?

Internet Activities

Conclusion

Polygons are every where around you. Geometry is found in many facets of your live. Long live Geometry !

This Website created by Filamentality

Content by Ms. Brown, mbrown_38@hotmail.com
http://www.kn.pacbell.com/wired/fil/pages/sampolygonsms.html
Last revised Fri Jul 2 7:07:08 US/Pacific 1999

POLYGON QUIZ-Answer Key

(http:www.kn.pacbell.com/wired/fil/pages/sampolygonsms.html)

1. 4
2. rhombus
3. trapezoid
4. pentagon
5. 1080°
6. 360°
7. nonagon
8. decagon
9. 12
10. 2
11. 3
12. 4
13. rhombus
14. 180(n-2)
15. [180(n-2)]/n
16. 360°
17. 72°
18. 60°
19. 108°
20. 135°

HUNT FOR POLYGONS

an Internet Treasure Hunt on POLYGONS

created by Brown and Eyre

Introduction | The Questions | Internet Resources

Introduction

Surf's up! Grab your brain and head for the further reaches of cyberspace. Now that you're familiar with polygons, do they have anything to do with the real world? Using this scavenger hunt you're going to find out. Use the sites listed to answer the questions.

1. What 2 polygons are contained in a Buckyball?

2. What does a Buckyball remind you of?

3. What is modular oragami?

4. What is a 39 sided polygon called?

5. Name 2 properties of a semi-regular tesselation

6. List 2 theories about how stone blocks were moved to build pyramids

7. Find 'Triangle in Petroglyph'. Answer the question at the end of the website

8. Find the following for a triclinic crystal: number of faces, shape of faces, and an example of the crystal

9. What is the triangle at Pu'uhonua O Honaunau used for?

10. What figures make up a Diakisdodecahedron?

11. What is a honeycomb core used for?

12. Why is molecular modeling important?

13. How many sides does a myriagon have?

14. What are 4 cardboard construction techniques for building paper polyhedras?

15. What is the prophecy of Naha stone?
16. Where is the Great Pyramid of Giza located?
17. What are the connections between Mathematics and Molecular Modeling?
18. How many sides does a Deltoid Dodecahedron have?
19. How many sides does an enneaconta have?
20. What does the word tesselate mean?

Questions

The Internet Resources

- Crystallographic Polyhedra
- Polyhedra in the classroom
- Tessellations
- Molecular Modeling
- Paper polyhedra
- Paper polyhedra
- Tessellations
- Polygons in Hawaii
- Polyhedra in the classroom
- Naming Polygons and Polyhedra
- The Great Pyramid of Giza
- Honeycombs

The Big Question

Can you think of any other places out in the world that contain polygons?

ANSWERS TO HUNT FOR POLYGONS

(http:www.kn.pacbell.com/wired/fil/pages/huntpolygonsbr.html)

1. hexagon and pentagon
2. soccer ball
3. a construction technique in which many similar or identical pieces are individually folded and then assembled together into a model
4. triacontakaiennea
5. a) formed by regular polygons
   b) the arrangement of polygons at every vertex point is identical
6. a) use of a straight ramp made of bricks and earth
   b) use of a spiral ramp
7. acute triangle
8. 6 faces
   parallelograms, no right angles
   turquoise
9. A-framed triangular structures were used as work sheds and storage
10. Quadrilaterals
11. Used in the fabrication of lightweight structures typically used in the aerospace and commercial markets
12. Using molecular modeling, scientists will be better able to design new and more potent drugs against diseases such as cancer, AIDS, and arthritis.
13. 1000
14. a) glueless origami methods
    b) the no-tab, taping method
    c) the one-tab method
    d) the two-tab method
15. the man who moved the Naha stone would be the greatest king of Hawaii and bring other chiefs under his rule.
16. Cairo, Egypt
17. Answers will vary
18. 12
19. 90
20. to form or arrange small squares in a checkered or mosaic pattern

Sites on the Internet Relating to Polygons

1. **Tessellation HyperCard Tips** **http://forum.swarthmore.edu/sum95/suzanne/tips.html**

2. **Tessellation**
   http://www.coolmath.com/tesspag1.htm

3. **Totally Tessellated**
   http://hyperion.advanced.org/16661/background/polygons.html

4. **The Pavilion of Polyhedreality**
   http://www.li.net/~george/pavilion.html

5. **Nets of Crystals**
   http://forum.swarthmore.edu/alejandre/workshops/crystalnet.html

6. **Grade 8: The Learning Equation Math**
   Polygons and Circles
   http://argyll.epssb.edmontooon.ab.ca/jreed/tlemath8/tledisk3/3101.htm

7. **Angles and Polygons - Mathematics 10**
   http://142.3.219.38/RR/database/RR.09.96/seidler1.html

8. **Icosahedron Net**
   http://forum.swarthmore.edu/alejandre/workshops/icosahedron.net.html

9. **Truncated Icosahedron – Buckyball Net Activity**
   http://forum.swarthmore.edu/alejandre/workshops/bucky.net.html

10. **Cuboctahedron Net**
    http://forum.swarthmore.edu/alejandre/workshops/cuboctahedron.net.html

11. **Dodecahedron Net**
    http://forum.swarthmore.edu/alejandre/workshops/dodecahedron.net.html

12. **Tetrahedron Net**
    http://forum.swarthmore.edu/alejandre/workshops/tetrahedron.net.html

13. **Cube Net**
    http://forum.swarthmore.edu/alejandre/workshops/cube.net.html

14. **Octahedron Net**
    http://forum.swarthmore.edu/alejandre/workshops/octahedron.net.html

15. **Elephant Puzzle**
    http://www.geom.umn.edu/docs/forum/ElPuz/

16. **Hyperlinks to related topics in Informal Geometry**
    http://euler.slu.edu/teachmaterial/hyperlinks_for_geometry.html

17. **Internet Geometry Projects**
    http://forum.swarthmore.edu/geometry/geom.projects.html

18. **Geometry Formulas**
    http://www.scienceu.com/geometry/facts/formulas/

19. **Mrs. Glosser's Math Goodies**
    http://www.mathgoodies.com/default.shtm

20. **Triangle Sum Conjecture**
    http://www.geom.umn.edu/~dwiggins/conj04.html

Geometry Hot List of Internet Sites

We offer these sites that we found that appear to be good for Geometry. We have not tried them. We simply found them while researching our topic. Hope they are helpful to someone.

1. **Welcome to Math Quilts**
   http://members.aol.com/mathquilt/

2. **Geometric Quilts - geometric, fractal, and other quilt patterns**
   http://members.aol.com/mathquilt/text/

3. **Conjectures in Geometry** – has definitions, sketches and explanations, and interactive Geometer's Sketch Pad demonstrations of conjectures
   http://www.geom.umn.edu/~dwiggins/mainpage.html

4. **Midpoint Theorem** – interactive investigation from JavaSketchpad
   http://home.netvigator.com/~wingkei9/javagsp/mid-thm.html

5. **Filimentality On-line Support – Guide for Teachers** - learn to create an easy WEB page
   http://www.kn.pacbell.com/wired/fil/guide_teachers.html

6. **Java Circles Version 1.4** - any of the Java sites are good and very interactive
   http://home.netvigator.com/~wingkei9/javacircles/index.html

7. **Patterns Program** - has four shapes to manipulate and tessellate
   http://www.best.com/~ejad/java/patterns/patterns_d.shtml
   http://www.best.com/~ejad/java/patterns/patterns_i.shtml

8. **Types of Angles** - acute, obtuse - interactive Java applet
   http://www.utc.edu/~cpmawata/geom/geom1.htm

9. **Gallery of Interactive Geometry**
   http://www.geom.umn.edu/apps/gallery.html

10. **Mathematics - High School Hub** - covers many subjects
    http://schmidel.com/hub/math.htm

11. **Math Forum - Internet Math Hunt**
    http://forum.swarthmore.edu/hunt/current.html

12. **Educational Java Programs**
    http://www.best.com/~ejad/java/

13. **Euclid's Elements**
    http://aleph0.clarku.edu/~djoyce/java/elements/toc.html

14. **Geometry Jokes** - eleven corny geometry jokes
http://www.csun.edu/~hcmth014/comics/geojokes.html

15. **A short course in trigonometry**
http://aleph0.clarku.edu/~djoyce/java/trig/

16. **Flashcard** - interactive multiple choice activities on basic definitions -
http://www.aplusmath.com/ccccgi-bin/flashcards/geoflash

17. **Midpoints of any Quadrilateral**
http://home.netvigator.com?~wingkei9/javagsp/midpt.html

18. **Mid-point Theorem** - interactive with JavaSketchpad
http://home.netvigator.com/~wingkei9/javasp/mid-thm.html

19. **Basic Terms**
http://www.mathleague.com/help/geometry/basicterms.htm

20. **Getting Started With Java Technology**
http://java.sun.com/starter.html

21. **Geometry** - has an extensive glossary that we liked
http://tqd.advanced.org/2647/geometry/geometry.htm

22. **Manipula Math with Java**
http://www.ies.co.jp/math/java/index.html

23. **NHPTV Knowledge Network – Geometry, Measurement, Trigonometry**
http://www.nhptv.org/kn/vs/mathla8.sht

24. **Welcome to the World of Escher**
http://www.WorldOfEscher.com/

25. **Introduction to Geometry**
http://tqd.advanced.org/2647/geometry/intro/intro.htm

26. **Welcome to Geometry Crash Course**
http://library.advanced.org/16284/geometry.htm

27. **Curriculum Links – Grade 8 Math – Shape and Space**
http://www.cbe.ab.ca/b610/curric/jrhhigh/math/8shape.htm